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CONFERENCE OF RUMANIAN ACADEMY OF SCIENCES ON ELECTRONIC COMPUTERS

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/Following is the translation of an article entitled "A Román Népköztársaság Akadémiájának Konferenciája az elektronikus számológépekről (English version above) by István Aczél in Magyar Tudomány (Hungarian Science), Vol V, No 9, Budapest, 1960, pages 554-557./

A conference on electronic computers was organized in Bucharest by the Rumanian Academy of Sciences (RAS). The aim of the conference was to inform scientists and management on the building and utilization of electric computers. Work already done on computers was described, and widening of their use was discussed. The success of the conference wat attributed in part to the interest shown by all representatives of the various government organizations.

The conference had three sections:

1. Theoretical research regarding electric computers.
2. Building and programming of electronic computers.
3. Use of the electric computers in industry and science.

The papers delivered dealt with results in these fields as well as with prospective ones. In the third section there were few results mentioned, but the speakers indicated the progress that can be made and drew attention to achievements abroad. The scientist went beyond the present utilization of computers and showed what computers can be used for, besides their present application in high speed calculations. The role of digital controlling machines, in directing the work of a group of machines and an entire production line, was discussed. The RAS, as of now, deals with this idea only in perspective, but has recommended the organization of a Central Scientific Institute for Automatization.

The role of electronical data-dipstrap machines was emphasized in organizational and management work. A few papers dealt with translating machines and predicted that they will be of the digital, programmed, automatic type. The Linguistics Committee and the Mathematical Institute of the RAS is laying the groundwork for machine translations. They are doing mathematical-linguistic research and the existing electronic computers with respect to their abailability to machine translation. Their first problem is the study of machine translation between Hungarian and Rumanian.

There was discussion on analogy-type computers. The arguments helped to evaluate the issue whether digital-type or analogy-type electronic computers should be built first. It seems that the two types complement each other. Where the tasks demand flexibility, a combination of the two machines may be the ultimate solution: the speed of the analogy computer will be utilized to obtain an approximation which then can be fed into the slower digital computer for an exacting solution.

The papers given at the conference and our subsequent visits to various institutions gave the following overall picture of the electronic computers built in Romania:

In the Atomic Physics Institute of the RAS, two digital computers (CIFA-1 and DIFA-2) were built. They were designed by V. Toma, Engineer. CIFA means Electronic Calculator of the Atomphysics Institute. Their construction is similar to the Ural-type computers of the Soviet Union. CIFA-1 has been working since the fall of 1957; CIFA-2 since Oct. 1959. Their speed is ca. 50 manipulations/sec. Feeding is done on a punched hole tape with small speed. Both machines have a magnetic drum storage of 512 words capacity. A word contains 31 bits. The programming is one-titled, each title consisting of two commands. The machines work with fixed binar points. Dating is done on a Siemens-type electric typewriter. The CIFA-1 has 1500, the CIFA-2 has 750 electron tubes. The CIFA-3 which is under construction will have only 150 electron tubes because the logical current rings will use ferrite rings. A ferrite ring data storage drum is being experimented with, but CIFA-3 will still have a magnetic drum. The machines are in operation for 12 hours daily on the average. About 1 hour is used everyday for checking the machines before works starts on them. The computer is being serviced by 15 people (six engineers, four technicians, three mathematicians and two operators). It seems that three mathematicians are fewer than needed for programing. Most of the work involves technological and

scientific calculations. They work out function tables, solve linear equation systems up to 30 unknowns, solve differential equations and work on quadratura and on Fourier-analysis, etc. One experimental wage-analysis was carried out. For the Bureau of Census a population prediciton was carried out for the next 15 years, based on 15000 feed-ins and on 80000 obtained data. This calculation was done on the CIFA-1 and represented a large saving in time.

There is a MECIPT-1 digital computer being built at the Timisoara (Temesvar) Polytechnic Institute which will be in operation by early 1961. A 1024 word capacity magnetic drum will serve as data storage. The drum will be furnished by the Calculation Technique Institute of hte Hungarian Scientific Academy.

An analogy computer was built at the Bucharest Military Academy (own design) which solves differential equations up to the 12th order. The machine can also solve linear equation systems up to 30 unknowns. The machine demonstrated the solution of a simpler differential equation for us. The Energetics Institute of the RAS has a smaller capacity analogy computer. This machine is also used for solving differential equations. The Rumanian government is seriously considering large scale production of electronic computers. This is shown by the report of their radio factory to the conference, in which they offer the series production of electronics computers. The road from report actual production is of course long but this example shows that the industry is marching ahead, even though it cannot yet produce IBM 700 and 7000 type machines as we/Hungarians/. It seems that development of the advanced types of computers will tie down the producing capacity of even the most advanced countries/i.e. the Soviet Union/ and they are not likely to help out others. The conference made a correct analysis, when they stated that the use of computers will be a function of their own industrial capability of producing them. Home production is, in short, necessary. To that end, the organization of a central scientific institute dealing with electronic computers is proposed.

There is little work presently being done in preparing possible tasks for electronic computers, although an organization dealing with such preparational work is being considered both by the RAS and the government. Presently there is a group of three people doing work in that direction. The leader of the group is the academician; Moisil members are L. Hammer mathematician and E. Balazs economist. Theoretical problems of linear programming are being studied at the Kolozsvar (Cluj) Calculation Institute

of the RAS. This group is led by T. Popoviciu. Mr. Moisil, in his opening speech, proposed an economic-mathematics commission within the RAS. The Rumanians plan to set up calculation centers where they would house the majority of nation's computers. Smaller electronic computers will be still located in research and planning institutes, however.

Two other fields of research were discussed at the conference: algebraic theory of automatic structures and numerical analysis. In the first field, Mr. Moisil directs a seminar which has 15-20 persons, mostly young mathematicians. Their findings are collected in Mr. Moisil's book: "Teoria Algebrica a Mecanismelor Automate" which was published in 1959. The latter field is being worked upon by T. Popoviciu, who leads a research group at the University of Kolozsvar (Cluj) and at the Calculation Institute of the RAS at Kolozsvar. The findings of this group is collected in the Studii si Cercetari de Matematica"; published at Kolozsvar.

The conference dealt with the training of scientists as well. The dean of the Bucharest Natural Science faculty, Mr. Mihoc, pointed out that from 1959/60 to 1961/62 a two-year special course is being offered in numerical analysis, electronic computers and their programming, mathematical logics, probability, statistics and linear programing and chance theory, within the mathematics department. The dean of the Bucharest Polytechnic, Mr. Dinculescu, said that an automatization section was organized there, which will build an analogy computer. They are also giving lectures on automatization, cybernetics andinformation theory. The National Society of Engineers and Technicians also helps in organizing courses in the field.

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